REMARKS

Claims 2, 3, 8, 11, 17, 20 and 21 have been amended, and claims 18-19 have been cancelled. Claims 2-12, 14, 16-17 and 20-21 remain for further consideration. No new matter has been added.

The objections and rejections shall be taken up in the order presented in the Official Action.

1. Claims 3, 6-7, 8, 11-12, 17-19 and 21 currently stand rejected for allegedly being obvious in view of U.S. Published Application 2003/0198968 to Matson (hereinafter "Matson") and U.S. Published Application 2002/0128234 to Hubbell (hereinafter "Hubbell").

Matson was filed on April 23, 2002. In contrast, the present application claims benefit to the priority date of April 12, 2002 from the PCT application PCT/EP03/03782, **which is 11 days before the filing date of Matson.** In compliance with 37 C.F.R. §1.55(a), an English language translation of the PCT application PCT/EP03/03782 and a verification of the translation (i.e. a certification by the translator that the translation is accurate) were submitted to the USPTO on October 12, 2004. (see the first page of the entry "10-12-2004 SPEC Specification 16" in PAIR for the certification). As a result, it is respectfully submitted that Matson is not prior art to the present application.

2. Claim 2 currently stands rejected for allegedly being obvious in view of U.S. Patent 5,465,151 to Wybourne (hereinafter "Wybourne") and U.S. Published Application 2001/0039018 to Matson et al. (hereinafter "Matson2").

Claim 2 recites a method for immobilizing biomolecules on a surface which includes the step of "*immobilizing the biomolecules on a surface of the layer of hydrophobic polymer by spotting....*" (cl. 2). The Official Action acknowledges that Wybourne fails to teach or suggest "*immobilizing the molecules by spotting.*" (Official Action "OA", pg 6). However, the Action issued Official Notice "*that the technique of spotting biomolecules is well known in the art.*" (Official Action "OA", pg 3 and 6). Specifically, the Action contends that "*the examiner is relying on Matson2* ***only*** *to show that the technique of spotting biochemicals is known in the art.*" (Official Action, pg 3, emphasis added). Applicants respectfully disagree for several reasons.

THE OFFICIAL ACTION FAILS TO CONSIDER MATSON2 AS A WHOLE

Applicants submitted that the Action is NOT considering Matson2 properly as a whole. In *In re Wesslau*, the court asserted that "*it is impermissible within the framework of section 103 to pick and choose from any one reference only as much of it as will support a given position, to the exclusion of other part necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.*" (353 F.2d 238, 241 (CCPA 1965)). Accordingly, according to a fair and proper reading, Matson2 merely indicates that 'manual spotting' may be used as applied to the invention disclosed therein. (see Matson2, [0062]). That is, there is no indication that the technique of manual spotting could be used in other applications.

A PERSON OF ORDINARY SKILL IN THE ART WOULD NOT HAVE COMBINED THE TEACHINGS OF WYBOURNE AND MATSON2

Wybourne teaches that "*[f]unctionilization renders the surface of the analyte branch* [14 of an optical waveguide 11] *capable of binding analyte molecules or otherwise renders the analyte branch responsive to analyte molecules in a way that alters the surface chemistry of the analyte branch.*" (col. 7, line 45 to col. 8, line 9). "*The waveguide* [11] *is fabricated of a material exhibiting a refractive index (designed by the variable "n") to the electromagnetic radiation that will pass through the waveguide* [11]." (col. 9, lines 27-29). The "*waveguide surface is functionalized by exposure to a reagent, having molecules each comprising a nitrenogenic group and a functionalizing group, in the presence of energized charged particles such as electrons and ions, photons, or heat, which transform the nitregenic reagent to a nitrene intermediate.*" (Abstract).

In contrast, Matson2 teaches "[*a*] *method of attaching unmodified biopolymers, particularly, unmodified polynucleotides, directly to a solid support....*" (Abstract). "*Polymeric materials suitable for fabricating solid supports can be any material capable of being derivatized to form acyl fluoride functionalities on at least one surface of the solid support.*" (paragraph [0045]).

The applicants respectfully submit that a person of ordinary skill in the art would not be motivated to combine the teachings of Wybourne and Matson2. First, the scope and content of the prior art fails to teach or suggest that the waveguide material "*poly(styrene)*" taught in Wybourne is capable of being derivatized to form acyl fluoride functionalities as taught in Matson2. (See col. 10, line 37). Rather, in contrast, Wybourne teaches forming nitrene functionalities. Second, the proper scope and content of the prior art fails to teach or suggest that the support material having acyl fluoride functionalities taught in Matson2 has a refractive index to electromagnetic radiation that will pass through a waveguide allowing the waveguide to

properly function. Third, there is no teaching or suggestion that the support material having acyl fluoride functionalities taught in Matson2 has a nitrene intermediate formed from a nitrenogenic group and a functionalizing group. As a result, a person of ordinary skill in the art would have no reasonable expectation of success by combining the teachings of Wybourne and Matson2.

3. Claims 3-12, 14 and 16-21 currently stand rejected for allegedly being obvious in view of Wybourne, Hubbell and Matson2.

CLAIM 8

As amended, claim 8 recites a method for immobilizing biomolecules on a surface of a silicon semiconductor containing a plurality of CMOS photodiodes. The method includes the steps of: "*applying a layer of a hydrophobic polymer to the surface of the* ***silicon semiconductor****, and immobilizing the biomolecules on a surface of the layer of hydrophobic polymer by spotting.*" (cl. 8, emphasis added). The Official Action acknowledges that "*Wybourne fails to teach the substrate being a sensor chip, applying the biomolecules by spotting....*" (OA, pg 6). Thereafter, the Action contends that "*Hubbell teaches immobilizing biomolecules on the surface of a polymer that has been applied to the surface of a sensor chip...*" and that "*Hubbell teaches that their particular method is actually amendable to waveguides (0225).*" (OA, pg 7). Additionally, the Action contends that "*Matson 2 teaches that spotting is a well known means of applying biomolecules to a support (0062)*" and that it would have been obvious to one of ordinary skill in the art to have modified the waveguide sensor in Wybourne with the teachings in Hubbell and Matson2. (OA, pg 7). Applicants respectfully disagree.

A PERSON OF ORDINARY SKILL IN THE ART WOULD NOT HAVE COMBINED

THE TEACHINGS OF WYBOURNE, HUBBELL AND MATSON2

(1) Applicants submit that a person of ordinary skill in the art would not have been motivated to combine the teachings of Wybourne and Hubbell. Specifically, Wybourne teaches that an optical waveguide includes an analyte-branch, having a functionalized surface, and a reference-branch, where analyte molecules stick to the functionalized surface in the analyte-branch. (Wybourne, col. 8, lines 28-50). In operation, light passes through the both branches of the waveguide. (Wybourne, col. 8, lines 28-50). "*[W]hen the analyte-branch and reference-branch light beams are reunited upon entering the outgoing waveguide, a distinctive interference pattern is created. This generation of, or change in, the interference pattern is readily detectable by conventional methods.*" (Wybourne, col. 8, lines 46-50). Thus, according to a fair and proper reading, Wybourne teaches that the analyte molecules are disposed within the waveguide (i.e. in the analyte-branch of the waveguide), where the emitted light is sensed to determine properties about the analyte substance.

In contrast to Wybourne, Hubbell teaches that a waveguide is positioned to direct light towards the surface coated with a polymer that couples material thereto. (Hubbell, [0225]). In operation, after light passes through the waveguide, it travels between 50 to 200nm before interacting with the coated surface, where characteristics about the interaction between the light and the absorbed material are measured or calculated to determine properties of the absorbed material. (Hubbell, [0225]). Thus, according to a fair and proper reading, Hubbell teaches that the absorbed material is disposed on the coated surface outside of the waveguide, where characteristics about the interaction between the light and the absorbed material are measured and calculated.

As a result of the foregoing, it is respectfully submitted that Hubbell teaches away from the waveguide as taught in Wybourne. First, sensing a characteristic of the analytes in the analyte-branch of the waveguide in Wybourne would be replaced by the sensing of the absorbed analytes on the surface as taught in Hubbell. Second, not only would sensing in the analyte branch be redundant, but it would also interfere with the method of sensing taught in Hubbell. Specifically, the light emitted from the waveguide would no longer be constant (e.g. a known value) as it would be changed/altered as it travels through the analyte branch of the waveguide. Therefore, a person of ordinary skill in the art would not have been motivated to combine the waveguide sensor in Wybourne with the sensor chip in Hubbell.

(2) Applicants submit that the Official Action is NOT considering Matson2 as a whole. (see Official Action, pg 3 – "*the examiner is relying on Matson2* ***only*** *to show that the technique of spotting biochemicals is known in the art.*"). In *In re Wesslau*, the court asserted that "*it is impermissible within the framework of section 103 to pick and choose from any one reference only as much of it as will support a given position, to the exclusion of other part necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.*" (353 F.2d 238, 241 (CCPA 1965)). Thus, according to a fair and proper reading, Matson2 merely indicates that 'manual spotting' may be used as applied to the invention disclosed therein. (see Matson2, [0062]). That is, there is no indication that the technique of manual spotting could be used in other applications, such as with the teachings in Wybourne.

In point of fact, as set forth above, a person of ordinary skill in the art would not have been motivated to combine the teachings of Wybourne with the teachings in Matson2. First, the scope and content of the prior art fails to teach or suggest that the waveguide material "*poly(styrene)*" taught in Wybourne is capable of being derivatized to form acyl fluoride

functionalities as taught in Matson2. (See col. 10, line 37). Rather, in contrast, Wybourne teaches forming nitrene functionalities. Second, the proper scope and content of the prior art fails to teach or suggest that the support material having acyl fluoride functionalities taught in Matson2 has a refractive index to electromagnetic radiation that will pass through a waveguide allowing the waveguide to properly function. Third, there is no teaching or suggestion that the support material having acyl fluoride functionalities taught in Matson2 has a nitrene intermediate formed from a nitrenogenic group and a functionalizing group. As a result, a person of ordinary skill in the art would have no reasonable expectation of success by combining the teachings of Wybourne and Matson2.

THE COMBINATION OF WYBOURNE, HUBBELL AND MATSON2 STILL DOES NOT TEACH THE FEATURES RECITED IN CLAIM 8

Applicants submit, assuming for the moment, without admitting, that Wybourne, Hubbell and Matson2 are properly combinable, the combination still fails to teach or suggest the feature of "*applying a layer of a hydrophobic polymer to the surface of the silicon semiconductor....*" (cl. 8, emphasis added). Specifically, as set forth above, Hubbell merely teaches that a waveguide is positioned to direct light towards the surface coated with a polymer that couples material thereto. (Hubbell, [0225]). In operation, after light passes through the waveguide, it travels between 50 to 200nm before interacting with the coated surface, where characteristics about the interaction between the light and the absorbed material are measured and calculated to determine properties of the absorbed material. (Hubbell, [0225]). Therefore, the combination would merely teach that the waveguide was positioned to direct light towards the surface, where the waveguide is positioned 50 to 200nm away from the surface of the sensor chip. That is, the

surface would not be integrated into the walls of the waveguide and vice versa. Therefore, the combination would still fail to teach or suggest the features of "*applying a layer of a hydrophobic polymer to the surface of the* ***silicon semiconductor****, and immobilizing the biomolecules on a surface of the layer of hydrophobic polymer by spotting.*" (cl. 8, emphasis added).

In summary, a person of ordinary skill in the art would not have been motivated to combine the teachings of Wybourne with either Hubbell or Matson2. However, assuming for the moment, without admitting, that the references were combined, the combination would still not teach or suggest the feature of "*applying a layer of a hydrophobic polymer to the surface of the silicon semiconductor ....*" (cl. 8, emphasis added). As a result, it is respectfully submitted that claim 8 is NOT obvious in view of the combined teachings of Wybourne, Hubbell and Matson2.

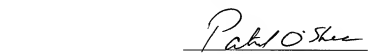
CLAIMS 3-7, 9-12, 14 AND 16-21

Applicants respectfully submit that this rejection is moot since claim 8 from which claims 3-7, 9-12, 14 and 16-21 depend is patentable for at least the reasons as set forth above.

For all the foregoing reasons, reconsideration and allowance of claims 2-12, 14, 16-17 and 20-21 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,



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